

## China's Coal Industry – Benefiting from Sustainable Demand Growth, Huge Unexploited Reserves and Favorable Government Policy

### Executive Summary:

- **Coal is still the dominant source of energy for China, providing approximately 70% of the country's total energy consumption.** Despite tremendous investments in renewable sources and in the oil, natural gas and methane industries, we believe coal will remain the dominant energy source for China in the foreseeable future because of its availability and cost. Over the past 20 years, China's coal production has grown rapidly. However, consumption has grown at an even faster pace, driven by increases in industrial energy demand, resulting in China being a net coal importer. Significant new investments, changes in government policy and relatively stable and high coal prices are all contributing to the continued growth in coal production. This report examines trends, recent developments, and factors that will impact the future of the coal market.
- **Investment opportunities exist in different areas:** In recent years, the number of new discoveries of exploitable coal reserves has fallen, but the total accumulated reserves of coal, available for exploitation, continue to grow. China's energy needs demand that these reserves be exploited, and the relatively high and stable prices of coal make coal extraction an attractive investment. Key investment opportunities in this environment include:
  - **Mining companies with novel energy extraction technologies:** As China's coal industry matures, new technologies for extraction at greater depths, including enhanced safety as well as ventilation systems, and the capture of greenhouse gases that escape during the operations will be in great demand. Core opportunities for investors are in companies developing new coal deposits and using the most modern technology for all operations, while companies developing "green" extraction methods, especially those that can pair extraction with CO<sub>2</sub> and nitrogen oxide (NO<sub>x</sub>) sequestration as well as mercury removal will have the advantages of benefiting from new policy thrusts.
  - **Mining companies with industry consolidation abilities:** China has tens of thousands of small locally-owned and managed coal mines where equipment is outdated and poor safety practices prevent the full exploitation of coal resources. To modernize, increase the efficiency, safety and capacity of the coal industry as well as eliminating most of the very small-scale or illegal mining operations, the Chinese government plans to form 10 large and 10 medium-sized coal companies to manage 60% of the country's total coal production. It also has a plan to impose a cap of 4,000 on the total number of separate coal-producing enterprises, using M&A and takeover to eliminate more than 90% of existing coal companies.
  - **Transportation infrastructure:** The majority of new coal reserves in China are not located near the urban centers or manufacturing hubs where energy consumption is increasing the fastest. Therefore, coal must be transported to the conversion plants near these places via roads and railways. The rapid growth of many industries almost concurrently in China has put severe strain on all layers of the existing transportation infrastructure. As a result, there is a special need for new railways for coal transport from the regions where it is mined to the locations where it is used.
  - **Energy production and distribution network:** The strong growth in electricity consumption throughout China has been driving the need for a substantially improved electric grid and more power plants. The construction of new plants and new grid infrastructure is already underway, but the pace needs to accelerate. New technologies enabling a smarter grid and for cleaner energy production will become increasingly important.



- **Many factors are driving the growth of the Chinese coal industry, led by the strong appetite for energy in the country supported by huge unexploited reserves and favorable government policies.**
  - **Strong growth in energy demand.** China's 2012 power consumption increased by 5.5% year-over-year (yoy) to 4,960 billion kilowatt hours (kWh), with the strongest growth in manufacturing and heavy industry – sectors that are experiencing close to a 10% growth each. The 2012 overall consumption growth rate of 5.5% is below recent averages, and a faster growth is expected as China's economic recovery takes a stronger hold.
  - **Significant unexploited resources:** According to the World Energy Council, China holds approximately 128 billion short tons (a short ton equals to 2,000 pounds or 907.18474 kilograms) of recoverable coal reserves, the third-largest in the world (behind only the U.S. and Russia) and roughly 13% of the world's total. In addition, many of the existing reserves are being poorly exploited by small, low-tech and inefficient mining companies.
  - **Policy support:** According to the U.S. Energy Information Administration (EIA), China is becoming increasingly open to foreign investment in the coal sector in an effort to modernize its existing large-scale mines and introduce new technologies into the coal industry. Areas of interest in foreign investments include coal liquefaction, coal bed methane (CBM) production, coal-to-gas and slurry pipeline transportation projects. The Chinese government is actively promoting the development of a large coal-to-liquids industry as one important mechanism for the use of its abundant coal resources to provide energy in a dynamic marketplace.
  - **Global pricing, local demand:** Global coal prices decreased substantially in 2012 due to the slowdown of the global economy coupled with the increased competition from low-priced natural gas in the U.S. where output has been on the rise arising from breakthroughs in the drilling technique known as hydraulic fracturing (fracking). This created a temporary oversupply of coal in 2012, filling the storage capacity in Chinese ports and leading to record inventories in Chinese coal-fired electrical power plants in the coastal provinces. However, the depressed global coal prices did not impact the non-coastal, secondary provinces in China such as Yunnan, Guizhou and Guangxi to the same degree as the coastal area. Due to the shortage of freight rail in China, it is costly to move imported coal inland, offsetting most of the price advantage of imported coal. As a result, the demand and price for coal in the non-coastal provinces have been less negatively impacted.
- **Key challenges for the growth of the coal industry in China include many distinct factors.**
  - **Slowdown in the growth of the Chinese economy:** During 2011 and 2012, the Chinese GDP growth rate fell below the recent highs near 10%, putting some downward pressure on coal prices and reducing enthusiasm for investments in the coal industry. China's GDP rebounded to a 7.9% growth in 4Q 2012, exceeding some expectations and reversing the decelerating growth seen in prior quarters, and it may be a positive indication for renewed strong demand for coal. Nevertheless, the success of the coal industry will absolutely depend on the growth of the Chinese economy in general.
  - **Competing energy sources:** To reduce its reliance on coal, China has made significant investments in oil exploration, and it is expanding investments in unconventional natural gas extraction methods, following the example of success in North America. Coal bed methane (CBM) is expected to grow significantly in the near future, and the ability to extract gas from coal seam and convert it to liquefied natural gas will be important. The Chinese government has set a target to raise non-fossil fuel energy consumption to 11.4% of the country's energy mix by 2015 as part of its new 12<sup>th</sup> Five-Year Plan. EIA projects coal's share of the total energy mix for China to fall to 59% by 2035 due to anticipated higher energy efficiencies and China's goal to reduce its carbon intensity (carbon emissions per unit of GDP). However, absolute coal consumption is expected to double over this period, reflecting the huge growth in total energy consumption.



- **Environmental factors:** The Chinese government is becoming increasingly concerned over pollution and climate change – both are known to be severely impacted by China’s reliance on coal for energy generation. The increasing awareness of these issues among an increasingly informed and concerned population is certainly driving new policies and investments to address these problems. This is a negative for conventional coal demand, but an opportunity for investors in new technologies for clean or “green” coal use.
- **Effective consolidation strategy:** The government is working to create incentives and other measures for consolidation as needed for modernization. Very aggressive goals are also in place, but they would be hard to be achieved without significant non-market pressure. It will be very important that these incentives and policies do not impose barriers of entry into this market.